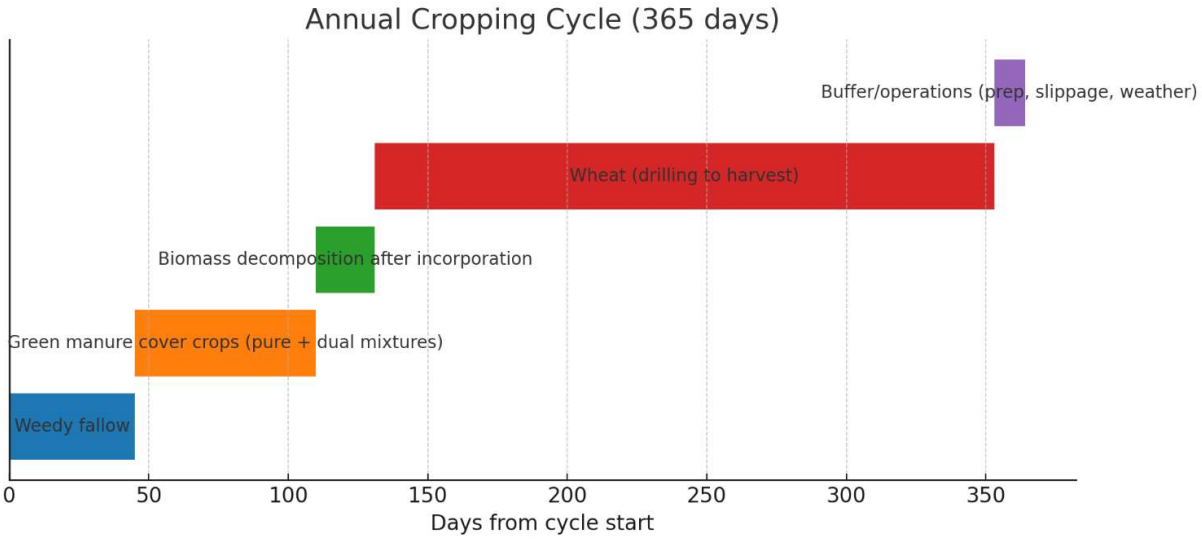

Annual system (365 days) — fixed plots, legacy effects

Sequence & durations

1. **Weedy fallow** — **45 days**
2. **Green manure cover crops (pure + dual mixtures)** — **65 days**
3. **Biomass incorporation & decomposition** — **21 days**
4. **Wheat (drilling → harvest)** — **220–225 days** (I model 222.5 d for arithmetic)
5. **Operations buffer** — **~9–14 days** (field prep, irrigation gaps, logistics) to complete **365 days**

I've put this into a clear schedule table and a Gantt-style timeline for you (both aligned to a 365-day cycle). You can view the table in the workspace, and download the figure here: **Download the timeline PNG**.

What the file shows (key empirical anchors)

- Across study years, wheat yield ranged from **6,760 to 10,171 kg/ha** under the summer sequence based on weedy fallow + cover crops (fixed plots).
- Biomass–yield regressions (across years):
  - **Cover-crop biomass → wheat yield**: $y = 573.8x + 6399;\ r^2 = 0.9039$
  - **Weed biomass → wheat yield**: $y = 1136.8x + 5474.5;\ r^2 = 0.9864$
- The document explicitly discusses positive **legacy effects** of the cover-crop phase on wheat grain yield (even with the initial weedy fallow present), with higher absolute yields where cover crops are used.

Interpreting the 365-day cycle (how each phase drives yield)

1) Weedy fallow — 45 days

- Provides a short burst of biomass that correlates tightly with yield within-season (higher r^2), but largely **recycles existing soil nutrients** and can contribute to **long-term nutrient mining** if relied on alone.
- In this fixed-plot system it acts as a **baseline biomass layer** before cover-crop establishment.

2) Green manure cover crops — 65 days

- **Legumes** contribute biological N; **C4/non-legumes** add fast canopy closure and high bulk biomass for carbon inputs and weed suppression.
- This phase is the **main driver of positive legacy**: increases soil organic C and nutrient retention, supporting the higher end of wheat yields (up to ~10.17 t/ha).

3) Decomposition window — 21 days

- Incorporation + ~3-week mineralization synchronizes nutrient release with early wheat demand; critical for translating biomass into available N and improved tilth at planting. (Decomposition protocol and soil-C assessment methods are described in the file.)

4) Wheat season — 220–225 days

- Long crop duration fully **captures both short-term (mineral N) and longer-term (soil C/structure/water) legacies** from the summer biomass.
- Despite the tighter *statistical* fit of weed biomass, **absolute yields are consistently higher with cover-crop biomass in the system**, reflecting its superior legacy on soil quality and nutrient cycling.

5) Buffer/operations — 9–14 days

- Realistic slack for tillage/strip till/disc passes, irrigation breaks, residue handling, machinery windows; this reconciles the 351–356 counted days with the **365-day annual cycle** (the file details real sowing/harvest windows and field operations timelines).

Why the two regressions make sense together (under fixed plots)

- **Higher r^2 for weeds** reflects immediate, same-season correlation (biomass present just before wheat) but **does not capture long-term soil building**.
- **Cover-crop biomass** shows slightly more scatter year-to-year (weather/species mix effects) yet drives the **higher yield ceiling and sustained soil improvements**, which the file attributes to the legacy of summer cover-crop management.

Practical takeaways for your management notes

- Keep the **45d weedy fallow** short and consistent; its role is transitional.
- Optimize the **65d cover-crop** window for rapid canopy, N fixation, and biomass (pure legumes + dual mixtures per your treatments).
- Protect the **21d decomposition** period; don't shorten it—this is where biomass becomes plant-available N.
- Expect wheat (220–225 d) to express the **combined legacy**; target planting on the earlier side within your feasible window to maximize cool-season use of released N (file shows detailed ops calendars and analysis workflow).